

Molotov: Full-Scale Platform Prototyping Exercise

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MOLOTOV

Full-Scale Platform Prototyping Exercising

- **MIGRATE SOFTWARE FROM CRAY TO
COMMODITY-BASED HARDWARE**
- **DEVELOP PORTABLE END-TO-END
BENCHMARK**
- **DEVELOP STRATEGIES FOR LINKING
LOCAL TO PRODUCTION
ENVIRONMENT**
- **PROVIDE ADDITIONAL COMPUTER
POWER FOR DEVELOPMENT**
 - PROOF-OF-CONCEPT FOR COMMODITY
MACHINES**
 - BUILD CONFIDENCE THAT APPROACH
IS VIABLE**
- **DEVELOP OPERATIONAL WORKROOM
CAPABILITY**
- **TEST PROCUREMENT PROCESS**

DAO COMPUTING REQUIREMENTS

OPERATIONAL IN MID 1998

**INTEGRATED HARDWARE/SOFTWARE
DEVELOPMENT**

A MEASURE OF PROJECTIONS (SUSTAINED, TEMPERED)

<u>1998</u>	<u>2000</u>	<u>2002</u>
50 GFLOPS	500 GFLOPS	1,200 GFLOPS

BUT, FLOPS IS NOT A GOOD MEASURE

- **INTER- AND INTRA- MACHINE COMMUNICATIONS**
- **MEMORY BOUND**
- **INPUT/OUTPUT**
- **MASS STORAGE/ARCHIVAL 20/80**

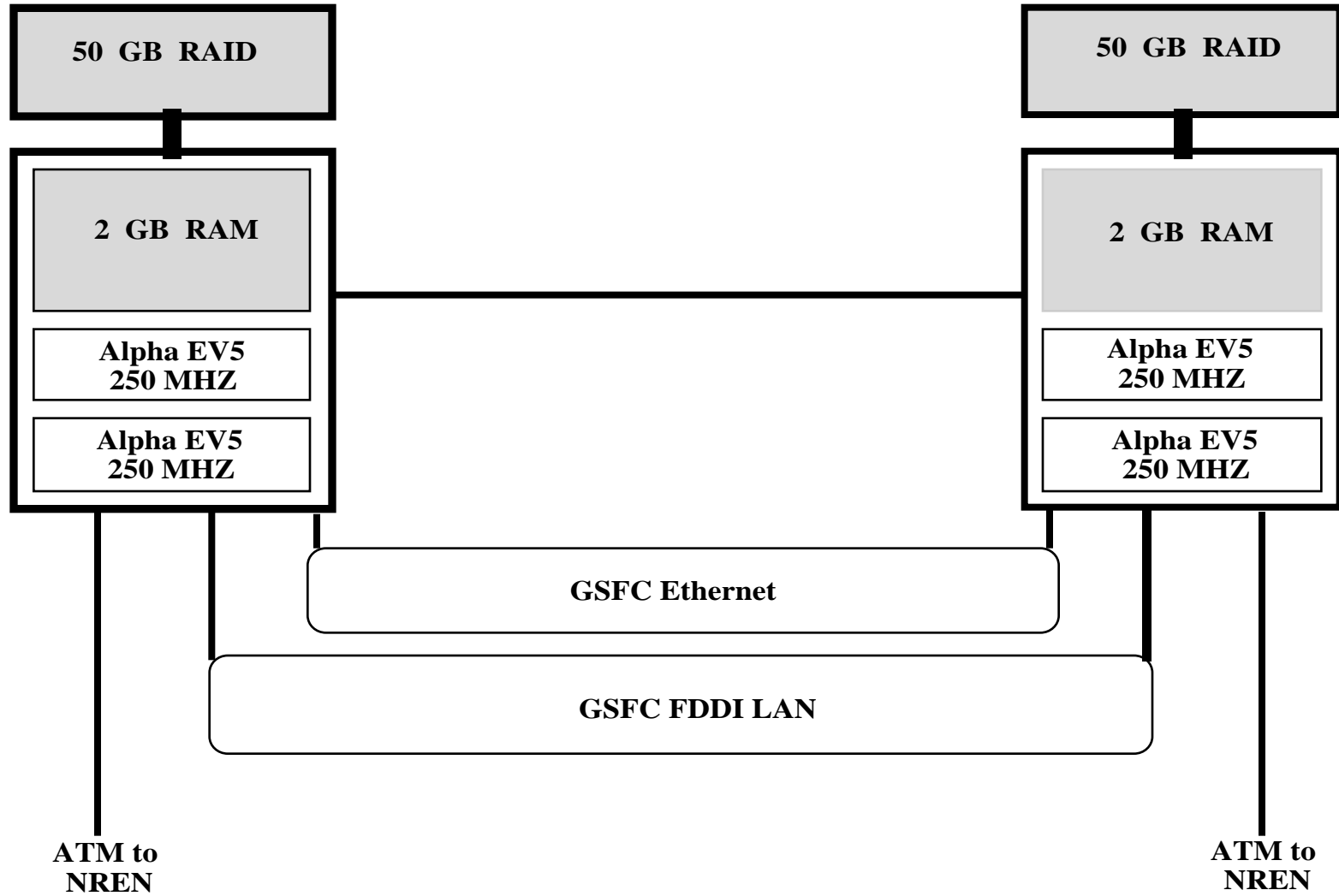
METRIC IS HOW MUCH THROUGHPUT PER DAY

REANALYSES: 30 DAYS OF ASSIMILATION PER DAY

**Budget Constrained Numbers
(Paradigm shift in computing,
Fall from \$1200/MFLOPS to \$20/MFLOPS by 1998)**

<u>Year</u>	<u>Sustained (GFLOPS)</u>	<u>Storage(TB)</u>
95	0.5 (+0.3)	13
96	0.5(+0.5)	20
97	35	24
98	50	43
99	75	70
00	150	110
01	225	150
02	500	200
03	750	300
04	1200	500

MOLOTOV



CURRENT MOLOTOV

- **TWO 2100 ALPHA SERVERS**
TWO EV4 EACH BOX, WITH EV5 UPGRADES
2 GBYTES MEMORY EACH BOX
- **TWO RAIDS, 50 GBYTES EACH**
- **DEDICATED FDDI BETWEEN BOXES**
MEMORY CHANNEL IN FEB '96
- **FDDI TO THE WORLD**
- **ATM TO NREN**

MOLOTOV RESULTS

- **PSAS: 32 BITS, 75 MFLOPS**
64 BITS, 64 MFLOPS
STARTED AT 150 MFLOPS ON C-90, BUT C-90 HAS BEEN IMPROVED IN THE
PROCESS TO >200 MULTITASKS WELL ON CRAY, 16.3 GFLOPS ON THE
INTEL PARAGON
- **GLOBAL SPECTRAL MECHANISTIC MODEL: 64 BITS, 35 MFLOPS**
THROUGHPUT 95% OF CRAY
- **CHEMISTRY TRANSPORT MODEL: 64 BITS, 26 MFLOPS**
- **MESSAGE PASSING TESTS**
USING BUS: 170 MICROSEC FOR MPI
250 MICROSEC FOR PVM
USING FDDI: 700 MICROSEC
- **I/O TESTS**
DISK TO RAID: 1.7 MB/SEC
RAID TO RAID: 5 MB/SEC
MEMORY TO RAID, UNFORMATTED FORTRAN WRITE: 10 MB/SEC PROJECT
22 MB/SEC IN NEXT TEST